

What is claimed is:

- 1 1. A method of optical signal regeneration comprising the steps of:  
 2       generating a phase and amplitude encoded clock signal from at least an input  
 3       optical signal;  
 4       introducing the encoded clock signal into a delay interference section of the  
 5       regenerator such that an amplitude modulated clock signal is produced; and  
 6       outputting the amplitude modulated clock signal wherein the output amplitude  
 7       modulated clock signal preserves information present within the input optical  
 8       signal.
- 1 2. The method according to claim 1 wherein said delay interference comprises the steps  
 2 of:  $N$   
 3       splitting the encoded clock signal into at least two optical signals; and  
 4       delaying one of the encoded signals by an amount  $\Delta t$  from another signal wherein  
 5        $\Delta t \cong N * \Delta t_{clk}$  , where  $\Delta t_{clk}$  is a clock pulse time delay measured between  
 6       subsequent clock signal pulses and  $N$  is an integer.
- 1 3. The method according to claim 2 further comprising the steps of:  
 2       optically amplifying the amplitude modulated clock signal.
- 1 4. The method according to claim 2 further comprising the steps of:  
 2       polarizing the amplitude modulated clock signal.
- 1 5. The method according to claim 2 wherein the delay interference section includes a bi-  
 2       refractive fiber in optical communication with a phase shifter.
- 1 6. The method according to claim 5 wherein the delay interference section further  
 2       includes a polarizer in optical communication with the phase shifter.
- 1 7. The method according to claim 1 wherein the generating step further includes the  
 2       steps of:  
 3       applying the input optical signal to a coupling section of an optical regenerator;  
 4       and  
 5       applying a clock signal to a modulation section of the optical regenerator.
- 1 8. The method according to claim 7 wherein said coupling section comprises a  
 2       photodiode.